ECOLOGICAL NOTES ON A COLONY OF SMALL SWALLOW-PLOVERS IN MYSORE STATE

BY

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Introduction

In the *Journal* for December, 1951, pp. 405-406, a report was given of a colony of Small Swallow-Plovers, *Glareola lactea* Temmnick, that had been observed briefly in 1951 on a sand bar in the Hemavati River at Sakleshpur, Hassan District, Mysore State (1). During 1952 it was attempted to extend observations on these birds, and also to study the avifauna and history of the nesting site in relation to the swallow-plovers. Owing to only sporadic opportunities to visit the river, the following comments do not present as continuous a story as might be desired, but a seasonal trend of events can nevertheless be discerned.

As indicated in the original note about these birds, the Hemavati rose in response to the deluge of the southwest monsoon, and the island was inundated by 12th June, 1952. No swallow-plovers could be detected at that time nor for the remainder of the monsoon period, the sand bar also remaining concealed beneath the rushing surge of the river. When the rains abated in late August, sand bars reappeared in the previous vicinity, where the river made a rather abrupt bend, but it was at once obvious that the configuration of various islands was drastically altered. The main sand bar, which had been the former site of the colony, was now divided into a small upstream segment and a larger segment below, separated by a narrow but deep channel. The lower segment, moreover, reached closer to the western bank of the river, so that as the flood continued to subside, it became evident that the entire series of sand bars, including numerous narrow strips flanking the two main islands, would be more accessible from shore in 1952 than in 1951. Sand and gravel had been deposited by river currents in such a fashion that the upper island had the least elevation above low water, but a gradually rising slope toward the downstream tip of the lower island led finally to a terminal sand bank that must have been at least three feet higher than the least elevated portion of the upper island.

Table 1 indicates the dates on which the river was visited and records the birds noted on each occasion. Since some of the trips had to be very brief, complete observations of birdlife were not invariably made. However the swallow-plover census was meticulously taken in every instance.

The Little Green Heron, *Butorides striatus*, a species that was not noted in the survey of Mysore birds by Sálim Ali (2), has already been reported to that authority on the basis of a Bangalore sight record. The table contains two additional new species records for Mysore State, namely the Pied Harrier, *Circus melanoleucus,* and

Temminck's Stint, *Erolia temminckii*. Further comments on the species may be made as follows.

TABLE 1. Birds seen in 1951 and 1952
Hemavati River, Sakleshpur, Mysore State

	20 Nov.	22 Jan.	30 Jan.	7 Feb.	27 Feb.	13 Mar.	29 Mar.	14 April	28 April	12 May	29 May
Jungle Crow ...					1	2				1	
White Wagtail ...		1		1							
Large Pied Wagtail ...		1		2	+	1		2		1	
Malabar Crested Lark ...								2			
Pied Kingfisher ...	2				1		1			1	
Common Kingfisher ...		1		1	2					1	1
Brownheaded Storkbilled Kingfisher ...					1						
Whitebreasted Kingfisher ...					1						
Crested Serpent-Eagle ...					3						
Pariah Kite ...		1									
Pied Harrier ...					1						
Small Swallow-Plover ...		13	6+	13	20	18	21	12	4	6	12
River Tern ...		1									
Blackbellied Tern ...	2	2		2	3	2	1	2		2	2
Little Ring Plover ...	2	1		4	6	1	4	4	1	12	6
Redwattled Lapwing ...	12			6	2	2				2	
Green Sandpiper ...					2+			1			
Common Sandpiper ...	4	2		4	6	1	6	2			
Wood Sandpiper ...	10	2		6		2		2			
Greenshank ..	8	6		4	3	2	3	1		1	3
Temminck's Stint ...				1	3		2				
Whitenecked Stork ...				2							
Little Egret ...		3									
Little Green Heron ...			1								

1. Jungle Crow, *Corvus macrorhynchos* Wagler.

Undoubtedly crows are more frequent visitors to the island than indicated by the records in Table 1. The species was listed only when it occasioned special notice as when, on 13 March, I worried about the terns' chick, and on 12 May, when a pair of lapwings chased a Jungle Crow into a tree.

The apparent defencelessnes of swallow-plovers makes it difficult to understand why crows might not invade the colony at any time, drive them from their nests and consume the eggs or young. But even in the absence of such aggressive manoeuvres there were opportunities—probably daily—to rob the colony when human intruders disturbed the incubating birds. On my own visits I usually tried to make observations through binoculars at as great a distance as consistent with accurate visualization, but the record of footprints in the sand, plus occasional direct evidence, disclosed that local Indians frequently crossed the river at this point, using the island as a stepping stone. Often they drove cattle or buffaloes onto the island in order to wash them, and women also laundered clothes at the lower end of the large island. Remains of small fires were found in the vicinity,

of the dhobies. Finally, some people merely wandered along the margins of the island looking for useful debris, or sometimes stranding tiny fish in shallow pools in order to scoop them up onto the sand to dry. But I was never able to detect that any of these intruders—human or animal—took a direct interest in nesting birds.

These many visitors, although arriving and departing sporadically, afforded multiple opportunities for crows and other predators to invade the nesting territory, for the circling parent birds were a conspicuous emblem of circumstances in the area. However I did not see any crow approach a nest; nor did I find eggs that had obviously been broken by marauders.

2. **White Wagtail,** *Motacilla alba* Linnaeus.

Although recorded by Sálim Ali as a 'fairly common' winter visitor in Mysore State, this wagtail was observed only irregularly by me in the Sakleshpur region. Its occurrence on the island is not significant.

3. **Large Pied Wagtail,** *Motacilla maderaspatensis* Gmelin.

This wagtail is undoubtedly to be considered as part of the island's fauna, for there was little question that the birds were breeding nearby and used the island as one of their foraging grounds. On April 14, a pair was seen in evident courtship. The presumed male lifted its wings over its back and ran back and forth in front of the other bird. The same or another male was observed later on the same day singing from the top of a small tree on the west bank of the river.

Relation to Swallow-Plovers: possibly the active pied wagtails serve to warn swallow-plovers of the approach of intruders. No evidence of competition between the species was obtained.

4. **Malabar Crested Lark,** *Galerida malabarica* (Scopoli).

A pair observed on the island on April 14 impressed me as behaving 'suspiciously', for they seemed reluctant to leave a certain small area of sand and gravel. Since, however, there is abundant suitable nesting terrain on a sparsely-grassed slope about a furlong beyond the west bank of the river, no reason why the island should have presented special attractiveness for this purpose was apparent. This is a frequently seen species in Sakleshpur in open habitats. Significance to Swallow-Plovers: probably nil.

5. **Pied Kingfisher**, *Ceryle rudis* (Linnaeus).

Sálim Ali (2) met this species uncommonly in Mysore State, but I have found it the second most abundant kingfisher in Hassan, Mandya and Mysore Districts, being exceeded in numbers only by the White-breasted Kingfisher. On repeated automobile journeys along the same roads, I have seen it time and again at the same locations, suggesting that it may be rather sedentary and patchily distributed. The ones at the Sakleshpur island probably nested in a sand-bank at the river's edge; several likely sites with holes in them were seen, and the birds' fishing activities marked them as residents.

No relationship between swallow-plovers and any species of kingfisher could be defined.

6. **Common Kingfisher,** *Alcedo atthis* (Linnaeus).

The remarks under the preceding species must not be construed as an indication that Common Kingfishers are uncommon at Sakleshpur, even though Sálim Ali found them generally so in Mysore State (2). On the contrary they could usually be seen on visits to the river, and I feel confident that they nested in one of its banks. On May 12, I saw a kingfisher catch one of the tiny fish that have already been mentioned as being collected by local Indians through a stranding device. Small as its prey was, the kingfisher first flew to a perch in order to knock the fish into insensibility before swallowing such a morsel.

7. **Brownheaded Storkbilled Kingfisher,** *Ramphalcyon capensis* (Linnaeus).

To the single record at the island on February 27, may be added two other closely contemporaneous records—of a pair—seen about fifteen miles downstream where the banks of the Hemavati are flanked by overhanging trees and fringing groves of bamboo. The species is probably resident but must be uncommon.

8. **Whitebreasted Kingfisher,** *Halcyon smyrnensis* (Linnaeus).

Whitebreasted Kingfishers were often seen and heard throughout the Sakleshpur area and elsewhere in neighbouring districts, despite Sálim Ali's statement that it is not a common species in Mysore State (2). Since this bird is somewhat emancipated from the immediate vicinity of water, the solitary record at the island on February 27 should not be taken as representing its local status.

9. **Crested Serpent-Eagle,** *Spilornis cheela* (Latham).

Next to kites and vultures, serpent-eagles are among the commonest raptorial birds of the Sakleshpur region, being seen alike in areas of heavy and moderate rainfall. The three eagles noted over the island on February 27 circled past at a low elevation with much screaming, as if a 'triangular' courtship were in progress. They took no evident notice of the swallow-plovers, but there is no valid reason to discount serpent-eagles as potential predators in their occasional passage over the nesting site.

10. **Pariah Kite,** *Milvus migrans* (Boddaert).

Like the Jungle Crow, Pariah Kites were seen at or near the island far more frequently than listed in my note-book. The one recorded on January 22 was mentioned because it alighted and drank from the river. Brahminy Kites, *Haliastur indus* (Boddaert), were also numerous in the vicinity, especially over paddy fields along the east bank. Both species of kite must be regarded as constant threats to breeding swallow-plovers, not merely to their eggs and variously grown young, but to the parent birds themselves. But no evidence to support this opinion can be advanced from field observations.

11. **Pied Harrier,** *Circus melanoleucus* (Pennant).

An adult male of this species flew over the island on January 22. Hitherto unrecorded from Mysore State, this species had, I believe, already appeared twice through my binoculars,—once in the previous winter in Sakleshpur, and once during that same season high over Bangalore. In the latter instance my attention was drawn to the soaring bird by the sudden upturned eyes of pet pigeons that were ingesting driveway gravel. As an aside, I recommend the keeping and close observation of domestic poultry to those who wish to spot high-flying birds—no better look-outs exist.

Marsh Harriers *Circus aeruginosus* (Linnaeus), although not recorded in my notebook, were seen also to visit the Sakleshpur island, occasionally alighting to drink from the river. Neither species of harrier is likely to have had an ecological relationship with swallow-plovers.

12. **Small Swallow-Plover,** *Glareola lactea* Temminck.

This, the chief breeding species of the Sakleshpur island, has been selected as a centre around which to relate other birds occupying the same habitat. Yet so far as can be determined, the swallow-plovers lead a serenely detached existence in which other species may come or go without making a scrap of difference.

Actually the swallow-plovers must afford one of the best available lessons in the danger of taking field observations to one's anthropomorphic heart, for the apparent placidness of these birds is no sure indication that they are not vividly and vitally aware of each impending danger to themselves and their colony. A snail, threatened by a blackbird, may appear equally unperturbed, but in that case we may be confident that the snail has no premonition of its danger. But when a warm-blooded vertebrate, especially a bird, is concerned, we are accustomed to think of it in terms of a scatter-brained hen or even a frantic mouse. Nevertheless it cannot be proved that tranquillity may not be a species trait entirely compatible with such awareness of danger as characterizes more demonstrative forms. Actually such tranquillity in some cases may have definite survival value to the species, so that it comes to denote as important a protective device as the more conspicuous manoeuvres for defence or escape of such noteworthy, if diverse, organisms as mice, muntjacs and women.

Following the disappearance of swallow-plovers from the Sakleshpur island during the southwest monsoon of 1951, no systematic attempt was made to ascertain the date of their return, since it was not known with assurance that this species uses the same nesting site year after year. Their continued absence on 20 November, when the island was again exposed, may be an indication that such birds practise a distinct annual migration to an alternative habitat, but as will be disclosed in the next paragraph, this conclusion cannot be drawn from my field data.

On 22 January, 1952, the island was again devoid of birds. But about one furlong upstream, towards Sakleshpur, I came upon thirteen swallow-plovers on a different island. It occurred to me that they might have been at this site when I visited the river two months previously, for on the former occasion I limited my inspection to the breeding island.

The swallow-plovers were all resting on the sand, most of them near the water-line. Nine were on the island itself and four were on the opposite bank of a narrow channel. They sat with their breasts facing the sun, but they turned their heads to watch me if I were not in a direct line with them. They rested singly for the most part, although there was one group of three within a foot of one another. The others were scattered five to ten yards apart. The birds were squatting on the sand, one of them in a natural depression, but gave no sign of being (or pretending to be) incubating parents. They were not at all disturbed by my presence and allowed me to get within the closest range of my 8x binoculars. Even then one bird merely walked away a few steps, rather than flying.

One swallow-plover that I disturbed flew some distance and landed in front of another one. As it alighted it bent forward in a deep bow, as if it had stopped too quickly and had 'nosed over' like an airplane. I could not see the other bird's immediate response, but they next walked rapidly past one another, turned, and again walked rapidly past one another. One of the birds then withdrew to a distance of several yards. No other symptom of awareness of one swallow-plover about other swallow-plovers was displayed. I did not hear any of the flock make a sound.

The birds may have been on this island because of human activity (dhobies and fishermen) on the breeding island at the time. They clearly exhibited no activity suggesting early territorialism at a nesting site.

Now that it was known that the small swallow-plovers had 'returned' to Sakleshpur, observations were carried out more regularly and, when possible, in greater detail. A brief visit on 30 January, revealed the birds as still present on the upper island. A group of six were sitting at intervals of about a foot from each other. The rest were scattered. One, on a small sand-bar below the island, had 'the gapes,' repeatedly turning up its head and spreading its mandibles to their maximum extent. This behaviour was not observed again.

On 7 February two swallow-plovers were found on the breeding island, while at least eleven could be counted on the upper one. They were definitely more scattered than previously. However, they still showed no resentment towards me or any social behaviour among themselves, other than the fact that they formed an assembled flock.

On 27 February twenty to twenty-five swallow-plovers were present, all of them now on the original breeding island. The considerable increase in numbers, plus the return of all birds to a former nesting site, were suggestive of an influx of native birds from an extended sojourn elsewhere. This is perhaps the strongest argument that can be offered in favour of the theory of an annual—if local—migration by members of this species.

A number of scooped-out hollows in the sand were observed where the swallow-plovers had been resting. But the birds did not behave aggressively or defensively, being on the whole undisturbed by my presence. Perhaps scooping out false nests at this season is a harbinger of stronger urges soon to be felt. Another portent of increased activity was a soft rasping note, uttered infrequently however.

On 13 March many depressions in the sand, but no eggs, were noted. The eighteen swallow-plovers seen were well scattered over

the island, some in pairs, others singly or in small groups. They behaved as if slightly disturbed, gave a few mild whistles and flew about a bit.

This behaviour, considering the undemonstrativeness of swallow-plovers, should probably have been interpreted in terms of high passion, for on the following visit to the island on 29 March the first nest of the year was discovered. It contained only one egg, but it was among a large number of scooped-out hollows that appeared to represent the center of impending reproductive activities. This precocious egg antedates Major Pythian-Adams's clutch from an island in the Cauvery River by only twelve days (2), so that a highly consistent annual rhythm in breeding biology of swallow-plovers in Mysore State seems to have been outlined.

The nest hollows on the Sakleshpur island, begun long before the appearance of eggs, may have served as more than stimuli to dormant sexual urges, for there was evidence that they were being used at night for sleeping purposes. Many of them had collections of fecal material at their centres, or frequently at a point near the edge. Since swallow-plovers, as observed by day, were usually seen near the margins of the island, fecal accumulations must have been deposited during the hours of night. Nesting- or sleeping-hollows were situated close to the centre of the island. Some of them appeared to have been made entirely by the birds, while others looked more like old cattle, buffalo or human foot-prints that had been adapted for use with the least possible amount of architectural modification.

The evidence of fecal accumulations in hollows indicated that each bird might occupy more than one such dormitory on successive nights, for the number of hollows with signs of tenancy exceeded the number of birds—twenty-one—that I was able to count on this occasion.

Most of the hollows, including the one containing an egg, were in gravelly parts of the island, although there were both gravelly and sandy stretches in equally elevated and otherwise ideal places. The actual nest and the other hollows were five or six inches in diameter and about an inch to one-and-a-half inches deep. I could not discern that the birds brought any extraneous material whatsoever to contribute to the construction or decor of their nests.

The behaviour of the swallow-plovers remained sedate on this occasion, despite the fact that many of them must have been on the verge of laying eggs. They sat about in groups and moved only when I approached closely. Then some flew a short distance, while others went as far as the lower end of the island. There were no outcries of wing-dragging. The owners of the egg could not be distinguished by their differential antics.

Between 29 March and 14 April something must have happened at the breeding island to cause a profound disturbance among the swallow-plovers. On the latter date I first saw no birds at all, but soon I discovered about twelve of them on a small island just above the main one (not the upper island mentioned in January).

At the site of the nest found on 29 March on the main island a swallow-plover flew about near me calling, but I could not find the nest. The bird seemed agitated. I found no other nests here and the scraped hollows seemed not to have been recently worked. At the small upper island I found three nests with two eggs and one

nest with one egg. The birds were excited, flying about calling or else squatting on false nests or feigning injury. They did not drag 'broken' wings, but settled on the ground and beat both wings simultaneously against the sand. They would often run for short distances and again feign injury to entice me away.

This island was not built up as high above river level as the main breeding island. It was also less gravelly, consisting principally of a mixture of sand and mud. The color blended with that of the eggs, but owing to texture of the ground, eggs were easy to see. Some nests were next to land-marks such as sticks or wisps of grass, others not so related.

A few swallow-plovers were feigning injury on a still smaller island just upstream from the current nesting area, but no nests or eggs were found there and it is possible that the birds were merely trying to draw me farther away from the new breeding site.

There were no marks on the original breeding island to indicate why it had been abandoned so abruptly. Since most of the female birds must have been on the point of egg-laying, a strong stimulus would be required to force them to seek other nesting territory at such a time. The fact that only twelve birds remained nearby also points to a major deterrent event at the main island, so violent that some of the birds left the area entirely. Presumably the ones that merely moved upstream for a short distance must have scooped out nests and laid eggs almost at once.

Between this visit and my next one on 28 April, Sakleshpur received its first annual 'blossom showers', eagerly looked forward to by the coffee planters. This rainfall, which may be heavy although of short duration, further obscured the history of nesting swallow-plovers. For on this day no nests were to be seen and only four birds remained in the vicinity. These were at the recent breeding site and behaved like nesting birds, flying about calling, or alighting with 'false nest' actions. No young birds were found despite a careful search in an environment that afforded almost no chance for their concealment.

It appeared inescapable to me that tragedy had overtaken the colony. If young birds had been fledged, at least the twelve adults seen two weeks previously should still have been present. Perhaps a heavy shower had caused a sudden temporary rise in the river and washed away the eggs and young. Or perhaps the negative force experienced at the main island had now been directed at the new breeding area; if so, all traces of its nature had been obliterated by the rain. Former nests could not be identified in the sand and even what appeared to be numerous recent buffalo or bullock tracks could not be ascribed definitely to that category.

On 12 May there had again been several heavy showers. No swallow-plovers were at the recent breeding site, but I located three pairs near the spot where they were first seen in January, 1952. They behaved in a slightly 'territorial' fashion but not like nesting birds. No fledglings were present.

On 29 May twelve birds were seen at the January site. No fledglings were among them and they behaved in an unconcerned manner.

The 1952 monsoon set in early in June, and on my next visit to Sakleshpur all the islands in the Hemavati River were submerged.

By 25 September it was again possible to search the river banks and some of the islands. On this occasion I took pains to look up and down stream for a considerable distance beyond the breeding center but no swallow-plovers were found. It would seem that they really do go elsewhere during the monsoon.

13. **River Tern,** *Sterna aurantia* Gray.

This species has been seen along the river on more occasions than the single listing of its presence on 22 January in this series of notes. A pair was observed several times in 1951, but it is doubtful that they nested within the narrow spatial limits of my survey.

14. **Blackbellied Tern,** *Sterna melanogaster* Temminck.

Major Phythian-Adams's failure to find a nest of the Blackbellied Tern prompts me to cite the first breeding record of the species in Mysore State. In Table 1 it will be seen that at least one pair of these terns was resident constantly at Sakleshpur.

On 20 November it was noted that the terns were in breeding plumage, having by this time recovered from their post-nuptial appearance.

On 7 February both birds flew close over my head, one of them uttering a short nasal '*a-a-a*'. This was on the swallow-plovers' breeding island and at a time of year when the latter birds were still behaving in non-aggressive fashion. The terns were definitely courting. One alighted on a sand bar and the other went off to fish. Presently the second one caught a minnow and brought it to the sitting bird. But instead of giving up the fish, the captor immediately flew away with it, as if inviting pursuit. The sitting tern followed half-heartedly and soon landed on another sand bar. This time the fisherman came down and yielded the minnow, whereupon the recipient dashed off with it, the donor following in enthusiastic chase. The game of tag was quickly over and the terns reverted to quiet behavior.

Although three birds were present on 27 February, two of these were obviously already a mated pair. These two were agitated by my presence and swooped so close to my head that I could hear the wind in their wings as they veered away. One did the 'broken-wing act' on the swallow-plovers' island, although I could not find a nest.

The terns sometimes dived at a group of swallow-plovers and put them to short flight. They also chased a Jungle Crow from the island.

It was therefore not astonishing on my next visit, 13 March, to locate a tern that was brooding over a newly-hatched chick on the swallow-plovers' island. The baby was in a hollow in the sand that resembled a true nest. However there were no signs of egg shells or of other chicks. The parent birds dived at me in great dismay but did not resort to subterfuges to lure me away. On my quick withdrawal one of the birds returned promptly to shade the chick, for the sunlight was strong.

On 29 March only one tern contested my presence, but it did so vigorously, and I concluded that the chick was concealed somewhere nearby.

The next visit, on 14 April, was on the day that I discovered the first disruption of the swallow-plovers' colony. Two terns were on the same small island to which the swallow-plovers had moved, but as this was separated from the first breeding area by a deep, swiftly-flowing channel, it seemed unlikely that fledgling terns could have accomplished the crossing. The adult terns flew about me to some extent and called, although they were not nearly so demonstrative as on my last two visits. One was carrying a small fish. The chick was not seen.

Terns were not noted on 28 April. On 12 May the pair that was present gave me a cursory inspection, uttering one or two cries, and then flew off. The pair seen on 29 May was merely noted as present in breeding plumage. No terns were seen on 25 September after the southwest monsoon. It is probable that the Sakleshpur pair of birds failed to rear even a single chick and that they left the region during the rainy season.

Relation to swallow-plovers: Nesting terns of either species should help to protect swallow-plovers' nests by their own aggressive behaviour toward intruders. However we here encounter two opposed methods for accomplishing the same end, for the swallow-plovers' lack of exhibitionism, which may cause them to be overlooked, must be counteracted in some degree by terns' behaviour that is very conspicuous indeed during the birds' efforts to drive enemies from the spot.

There is no evident competition for food between terns and swallow-plovers, since terns subsist chiefly on fish while swallow-plovers hawk insects on the wing (3). Hence their common breeding ground could result in strife only if it became over-crowded, which was not the case at Sakleshpur. The occasional diving at swallow-plovers by terns during my visits to the island cannot be interpreted as evidence of antagonism between the two species; the manoeuvre resembled an act of hyper-excitement on the part of the terns and did not arouse a strong response in the swallow-plovers. The harrying of a Jungle Crow over the island by terns would be of definite value to swallow-plovers and any other species sharing the habitat for breeding or other purposes. Terns may be considered, on the whole, as distinct ecologic assets in the economy of swallow-plovers, failing in their beneficial potential only by virtue of their rarity.

15. **Little Ring Plover**, *Charadrius dubius* Scopoli.

Census figures for this species along the Hemavati River do not suggest that the northern form, *C. d. curonicus* Gmelin, was present during the winter months, although Sálim Ali collected it at that season in his survey of Mysore State (2). On the contrary, ring plovers were more scarce in January and February than in the breeding season later on. Hence Sakleshpur birds can probably be ascribed to the resident subspecies, *C. d. jerdoni* (Legge).

The first evidence of nesting activity was observed on 27 February, when several pairs of birds were on the swallow-plovers' island or on near-by sand bars. On this date one bird was seen to squat as if on a nest, although investigation proved that this had been a deceiving manoeuvre. However on 13 March only one ring plover was detected. On 29 March two pairs were present, and on 14 April, observing the same number of birds, I found one nest with three eggs on a sand

bar flanking the main island near the west bank of the river. On withdrawing from the nest, I saw a parent bird quickly return to the eggs and stand over them to provide shade. The nest was partly overhung by a small clump of grass.

As will be disclosed in a moment, it is not possible to state whether the clutch was complete at this time. In both Whistler's book (3) and Sálim Ali's 'Book of Indian Birds' (4) the full clutch of the Little Ring Plover is given as four eggs, but Major Pythian-Adams's set from Mysore State, taken at the same time of the year, consisted of only two (2).

On 28 April, the date on which all the swallow-plovers' nests had disappeared, the Little Ring Plover's nest had also vanished and I saw only one bird close by. The abundance of ring plovers—12 birds—on 12 May was associated with breeding behaviour on the part of some of them, although no nests or chicks were located. Perhaps some of the plovers were recently-fledged young that I failed to distinguish from their parents.

Relationship to swallow-plovers: Little Ring Plovers, being of mild disposition, appear not to impinge on the equally placid swallow-plovers. The two species commingle in harmony without evident competition or conflict from any standpoint.

16. **Redwattled Lapwing**, *Lobivanellus indicus* (Boddaert).

During cold weather lapwings were commonly met along banks and sand bars of the Hemavati River. But there was no occasion later, when the breeding season approached and arrived, to suspect that nesting of lapwings on the island was imminent, although the behaviour of the remaining pair or two strongly indicated that they were rearing young in the environs of paddy fields east of the river. Nevertheless the lingering sentinels performed good service to the swallow-plovers when they foraged on the island, not only by their alarm notes on any pretext whatsoever, but by their active pursuit of Jungle Crows. On 12 May the lapwings challenged not only me, but harried a crow until it took refuge in a thick tree on the eastern bank. Even then one of the lapwings continued to make sallies at the lurking bird but was unable to move it from its sanctuary.

Relationship to swallow-plovers: No direct association between species observed; certainly not a competitor. Sentinel activities are in the same category as those of the terns, viz., beneficial if it helps swallow-plovers to be surrounded by noisily conspicuous and aggressive species.

17. **Green Sandpiper,** *Tringa ochropus* Linnaeus.

This species may have been more common along the river in winter than noted by me, since it was only during the period of these observations that I first identified it.

Relationship of all sandpipers to swallow-plovers: No evidence of any association whatsoever was noted except in the possible case of Greenshanks' activities as sentinels.

18. **Common Sandpiper**, *Actitis hypoleucos* (Linnaeus).

No new observations were made on this species.

19. **Wood Sandpiper,** *Tringa glareola* Linnaeus.

No comments can be made.

20. **Greenshank,** *Glottis nebularia* (Gunnerus).

The opinions of Sálim Ali that this is a rare winter visitor and of Major Phythian-Adams that it is only occasionally seen (2) are belied by my experience at Sakleshpur (see Table 1). The occurrences of one bird on 12 May and three on 29 May are surely late dates for a 'winter visitor'. However the species had not returned by 25 September, 1952. My experience with Greenshanks seems obviously to illustrate the lacunae that exist in the knowledge of birds of Mysore State—gaps that cannot possibly be filled by brief collecting or observational surveys, but that can be bridged only by prolonged residential studies. Alas that I cannot serve further in this respect, and that bird-watching in Mysore State seems to have no other advocates!

21. **Temminck's Stint,** *Calidris temminckii* (Leisler).

A certain confusion regarding this species exists in my mind, since I first identified all stints at Sakleshpur as Little Stints, *Erolia minuta* (Leisler), on the basis of Sálim Ali's record (2). When I became aware of written descriptions of Temminck's Stints, however, I began to make careful field studies of individual birds. It then transpired that all the specimens that I could approach to the point of straining my eyes through the minimum focal adjustment of my binoculars had white outer tail feathers and greenish legs. There is no assurance that Little Stints did not occur at Sakleshpur, but the Temminck's Stints listed in Table 1 were all satisfactorily identified and constitute a new record for Mysore State.

Loose flocks of stints along the Hemavati River sometimes numbered as many as a dozen or fifteen birds, the first ones being noted on 22 January.

22. **Whitenecked Stork,** *Dissoura episcopus* (Boddaert).

Not met with by Sálim Ali's survey (2), but seen rather frequently by me in Mysore State. The pair that was present on the island on 7 February had obviously alighted only to spend the mid-day hours and had no relationship to the swallow-plovers' present or future activities (not that they would have refused to snatch up a half-dozen chicks or eggs, had they been available).

However the storks provided an amusing twenty minutes for me, since I was able to observe them at close quarters for the first time. I approached within about 100 feet of the birds, causing them to retreat slowly. They either walked ahead or flew across small channels, not seeming alarmed. Once when they came down they began to sun themselves. One bird rotated the wings forward so that the lining was uppermost. The wing-tips then touched in front of the stork, and the lining of the wing was therefore horizontal. It stood on one leg the while. The stork looked as if it were holding up an apron to receive a load of potatoes. Then both birds stood with their wings properly folded but held out at an angle of about thirty degrees from the body. They looked then like penguins on stilts, the wings resembling flippers. Finally the storks flew away and soared in high circles. Their wing positions while perched may have been antics related to

the dissipation of heat, for it was a hot day, particularly warm on the sand bar.

23. **Little Egret,** *Egretta garzetta* (Linnaeus).

More common than noted in Table 1. No relationship to swallow-plovers could be noted.

24. **Little Green Heron,** *Butorides striatus* (Linn.).

The single specimen seen on 30 January, constituting the second sight record for Mysore State, was perched on a low branch of a tree overhanging the east bank of the river. On my disturbing it, it flew to a similar perch not far away, bobbing its tail upon alighting. Observation through 8x binoculars at close quarters was entirely satisfactory to me.

Discussion

Whistler (3) cites the rising level of rivers as chief among the dangers to nesting swallow-plovers. To this opinion I freely subscribe in view of my own brief observations at Sakleshpur and my resultant suspicions. However the foregoing account suggests that there may occasionally be incidental factors that contribute to nesting failure. An attempt to evaluate all the forces is presented in Table 2. Briefly summarized, the adversities may be defined as:

1. Exposure of eggs and fledglings to excessive sunlight at times when human beings or other intruders wander into the nesting area.
2. The possible direct notice taken by human beings of nests and young as the resultant of parental displays of anxiety, whether by swallow-plovers or by associated nesting species, presumably more often the latter.
3. Opportunity for predators, especially crows and kites, to rob nest while adult birds are disturbed by intruders.
4. Accidental destruction of nests by wandering cattle and buffaloes, or those driven to the breeding island by their owners.

It is mysterious how swallow-plovers are able to survive. Observations to date would make it seem of particular interest, from the standpoints of evolution and ecology, to study this species carefully in an effort to define its suitability for survival, including: defence against enemies, food habits, relation to other birds and selection of breeding habitat. So far, only island nesting emerges as a protective form of behaviour, but this seems insufficient to account for species survival, especially in colonies such as the one at Sakleshpur. Furthermore, adherence to unfavourable breeding grounds, as at Sakleshpur, also seems disadvantageous. Man, perhaps, is a most significant enemy. If so, swallow-plovers may soon become a vanishing species. On the other hand, they must have survived for centuries with mankind as at present represented by rural Indians along India's rivers.

TABLE 2

Presumed potential relationship of associated factors to Small Swallow-Plovers on an Island in the Hemavati River near Sakleshpur, Hassan District Mysore State, in 1952.

Beneficial	Innocuous	Harmful
Large Pied Wagtail ...	White Wagtail	Man
River Tern ...	Malabar Crested Lark	Cattle
Blackbellied Tern ...	Pied Kingfisher	Buffaloes
Redwattled Lapwing ...	Common Kingfisher	Jungle Crow
Greenshank ...	Brownheaded Stork-billed Kingfisher	Crested Serpent Eagle (?)
Island Breeding ...	Whitebreasted Kingfisher	Pariah Kite
	Pied Harrier	Brahminy Kite
	Marsh Harrier	Climatic Factors
	Little Ring Plover	
	Green Sandpiper	
	Common Sandpiper	
	Wood Sandpiper	
	Temminck's Stint	
	Whitenecked Stork	
	Little Egret	
	Little Green Heron	

SUMMARY

1. An account of the annual cycle of Small Swallow-Plovers, *Glareola lactea* Temminck, in 1952 is given against a background of brief observations during the previous year at Sakleshpur, Hassan District, Mysore State, India.

2. It is attempted to demonstrate the ecologic relationship of this species to other birds observed on the breeding island, as well as to intruding men and animals and to climatic factors.

3. The evidence suggests that breeding species—swallow-plovers, terns and ring plovers—all failed to rear young in the 1952 season.

4. Reasons for nesting failure could not be defined, although several possibilities are suggested.

5. The evidence suggestive of local annual migrations of swallow-plovers in South India is considered.

6. Temminck's Stint and the Pied Harrier were recorded for the first time in Mysore State, while a second sight record of the Little Green Heron was obtained.

7. The first known instance of nesting of the Blackbellied Tern in Mysore State is recounted.

8. Modification of opinion of the status of several other birds in Mysore State is suggested.

9. The seasonal succession of birds in a habitat restricted to a small river island is traced from winter to the onset of the south-west monsoon. Many of the birds listed were only incidental visitors. Others participate in the ecology of inhabitants of the island.

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